101 Introduction to IT

Practice 01

Agenda

- IDE installation (PyCharm Edu) @ https://t.ly/VFAyh
- Create and run “Hello, World” application
- Variables and operations with them
- If & else operators
- Cycles (aka Loops)

Additional task

- Create a program that asks the user for their date of birth and counts their age in days, hours, and minutes.
- Output example

```
Your age is:
7712 days or
185088 hours or
11105280 minutes or
666316800 seconds
```

IDE installation

- Go to download page: https://t.ly/VFAyh
- Download & run installation file
- Create a first project & execute it

Create and run “Hello, World” application

Code listing:

```
print('Hello, World!')
```

Variables and operations with them

Variable definitions:

- `name = value`
- `name: type = value`

Type validation:

Variables and operations with them @ Example

Code listing:

```
print("Hi, what's your name?")


user_name = input("Your name is: ")

print(f"Welcome, {user_name}!")
```

Variables and operations with them

- int - numbers. Example, 123.
  - To get from string use: `int("123")`
  - To check if it's a number use: `"123".isdigit()`*
- float - floating-point numbers. Example, 123.823.
  - To get from string use: `float("123.823")`
  - To check if string is a float number use: `"123".isnumeric()`*
- string - text values. Example "This is a string value".
  - To convert something to string use: `str(123)`

* Both isdigit() and isnumeric() works for positive images

Variables and operations with them

To validate negative numbers you can use this code:

```
def is_number(input):
   if input.startswith("-"):
       input_normalized = input[1:].replace('.', '', 1)
       return input_normalized.isnumeric();
```

Negative numbers validation rule:

1. Remove sign if it appears
2. Replace ‘.’ or ‘,’ in the input
3. Use `isdigit()` or `isnumeric()` to ensure that it’s a valid number

Variables and operations with them @ Practice

- Get a number from user and print its square root to the console
- Get area width and length of the rectangle then return its area
- Get the radius of a circle from the user and calculate its area

If & else operators

```
if cond1:
    ...
elif cond2:
    ...
else:
    ...
```

If & else operators

```
if not cond1:
    ...
elif cond1 or cond2 and cond3:
    ...
else:
    ...
```

If & else operators @ Example

```
a = 200
b = 33

if b > a:
   print("b is greater than a")
elif a == b:
   print("a and b are equal")
else:
   print("a is greater than b")
```

If & else operators @ Practice

- Modify the previous solutions so that if the user enters values with which the program cannot work properly, an error message is displayed and the program is terminated
  - Hint: To terminate an application use function exit()

Cycles (aka Loops)

```
fruits = ["apple", "banana", "cherry"]

for x in fruits:
   print(x)
```

Cycles (aka Loops) @ Example

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
   print(x)
   if x == "banana":
       break
```

Cycles (aka Loops) @ Example

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
   print(x)
   if x == "banana":
       break
```

Cycles (aka Loops) @ Example

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
   if x == "banana":
       continue
   print(x)
```

Cycles (aka Loops) @ Example

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
   if x == "banana":
       continue
   print(x)
```

Cycles (aka Loops) @ Example

```
fruits = ["apple", "banana", "cherry"]
for x in fruits:
   if x == "banana":
       continue
   print(x)
```

Cycles (aka Loops) @ Practice

- Get 2 numbers X and Y from the user. Using loops, calculate and print to the console x^y

- * Modify the previous solutions so that if the user enters values with which the program cannot work properly, an error message is displayed and the user is prompted to enter the value again

Task 1 Solution

```
number = input("Enter number to get its square root: ")

while not (number.isnumeric()):
    print("Invalid input. Try again.")
    number = input("Enter number to get its square root: ")

number = float(number)

print(f"Square root of {number} is {number ** 0.5}")
```

Task 2 Solution

```
width, height = (input("Enter width and height separated by whitespace: ")
                 .split())

while not (
       (width.isdigit() and float(width) ⩾ 0) and
       (height.isdigit() and float(height) ⩾ 0)
):
   print("Invalid input. Try again.")
   width, height = (input("Enter width and height separated by whitespace: ")
                    .split())

width = float(width)
height = float(height)

print(f"Rect area is: {width * height}")
```

Task 3 Solution

```
import math

radius = input("Enter radius to get circle's square: ")

while not (radius.isnumeric()):
    print("Invalid input. Try again.")
    radius = input("Enter number to get its square root: ")

radius = float(radius)

print(f"Square is {math.pi * (radius ** 2)}")
```

Task 4 Solution

```
x, y = (input("Enter two digits separated by whitespace: ")
        .split())

while not (x.isnumeric() and y.isnumeric()):
   print("Invalid input. Try again:")
   x, y = input().split()

x = int(x)
y = int(y)

s = 1
for _ in range(y):
   s *= x

print(s)
```